

R.M.U. USE ONLY
PROBLEM STATEMENT NO:
DATE OF RECEIPT:



STAGE I RESEARCH PROBLEM STATEMENT

I. PROBLEM TITLE (required):

Swimming and leaping abilities of Montana's coldwater fish.

II. PROBLEM STATEMENT (required):

The weakest link in our ability to design new culverts, or assess existing culverts, with respect to fish passage is the lack of reliable information concerning the swimming and leaping ability of Montana's coldwater fish. Information for surrogate or *design* fish are currently used - essentially an anecdotal composite of what little information is available for species that are similar in name or nature. For example, one interested in designing a culvert to accommodate passage of bull trout would be required to use a combination of the limited information available for brook trout or rainbow trout. Furthermore, information relative to the size class of fish of interest may not exist at all. This compromise occurs with respect to both swimming ability and barrier leaping ability.

III. RESEARCH PROPOSED (required):

A combination of replicated field and lab studies should be undertaken. The species of fish used in the trials should reflect the coldwater species of interest in Montana. If lab trials are used (indoor or outdoor), the trials should be conducted in a manner that represents natural stream conditions as closely as possible. The trials should be designed to arrive at statistically appropriate probabilistic-based estimates of leaping and swimming abilities by size class for the species of interest. The one and only example in current literature of probability-based swimming capabilities is given in Fish Passage in Montana Culverts: Phase II – Passage Goals (FHWA/MT-07-010/8181). In this report the probability that spawning-class Yellowstone cutthroat and rainbow trout passed through study culverts was presented as a function of the water velocity in the culvert.

IV. IT COMPONENT (required): Identify if the project includes an IT component (purchasing of IT hardware, development of databases, acquisition of existing applications, etc) or not. If so, describe IT component in as much detail as possible.

No traditional IT component is foreseen, but field and lab trials may take advantage of passive integrated transponder (PIT) or similar technology, and the data-logging requirements of these devices should be considered.

V. URGENCY AND EXPECTED BENEFITS (required):

Credible swimming and leaping ability information is the missing link in our ability to tie hydraulic and physical conditions at an existing or planned culvert to the fish passage characteristics of that culvert. With this information, the balance between the passability of a given culvert and the resources available to construct and maintain the culvert can be struck. The benefits will be telling – confidence that the ultimate design of the culvert is appropriate, being neither too conservative (expensive) nor too lax (detrimental to fisheries).

VI. IMPLEMENTATION PLAN (required):

The results of this work should be directly interjected into the current design procedure used by MDT, replacing the surrogate or design fish with swimming and leaping criteria that accurately reflects the species and size class of interest.

VII. SUBMITTED BY: (required)

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Note: Submitter may attach continuation sheets if necessary.